Farmer-to-farmer extension of livestock feed technologies in Rwanda: A survey of volunteer farmer trainers and organizations

Evelyne Kiptot, Steven Franzel, Paul Nzigamasabo and Claude Ruganirwa

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Summary

This report presents the results of a study that was undertaken in Rwanda to determine the effectiveness of the volunteer farmer trainer (VFT) approach in the dissemination of livestock feed technologies in the East Africa Dairy Development (EADD) Project. This is in light of the fact that public sector extension services are no longer able to adequately provide extension services due to budgetary constraints facing most developing countries. As a result, new approaches and mechanisms are being developed to fill the gap. One such approach is the VFT approach. It is a form of farmer-to-farmer extension (FFE) where volunteer farmers are recruited, trained and they in turn train other farmers on improved agricultural practices. This approach has been in use by the EADD project in Rwanda since its inception in 2008; however scanty information has been documented about the performance of VFTs; hence this study which examined VFTs' perceptions, motivations, dissemination activities, competence and challenges they face. The study was undertaken in three districts of Rwanda: Rwamagana, Gatsibo and Nyagatare. They are located in the eastern province. A total of 86 VFTs from 17 dairy farmer cooperative societies, a third of whom were women, were interviewed using a structured questionnaire.

The VFTs interviewed were middle aged (about 43.3 years old), had served an average of 42.5 months and had trained an average of 24 farmers per month. A majority of them undertook their activities by foot (96.5%), followed by 46.5% who used their own bicycles, 39.5% used hired motorcycles and 32.5% hired bicycles. They covered an average distance of 7.6 km a day: men covered an average of 8.8 km and women an average of 4.0 km. This was statistically significant at $p < 0.01$. VFTs also trained farmers outside their own villages. They covered an average of 4.4 villages apart from their own. VFTs used various means of mobilizing farmers for their training sessions with the most popular methods being through their dairy farmer group leaders, local authorities, the use of mobile phones and public gatherings. Popular venues for training sessions were public places which included churches, schools and market centres. Others were demonstration sites and farmers' homesteads.

VFTs trained other farmers on average 2.7 times per month spending about 1.5 hours per training. They had each trained on average 216 farmers over 3.5 years and were training 24 farmers per month. There was no significant difference between the numbers of male and female farmers trained, nor did male or female trainers train significantly more farmers of one gender than the other.

The main motivation for becoming trainers was to gain knowledge and skills. This was followed by altruism, anticipated project benefits, social benefits and very few (6%) mentioned income. Three and a half years after becoming trainers, the findings revealed that demand for training was rated highly (2.4 out of 3.0), followed by gaining knowledge and skills and third came project benefits. There was no change in the VFTs who mentioned social benefits; however there was a slight increase of 9% in the proportion of farmers who mentioned income and a drop in the proportion of those who mentioned project benefits. Only 12.8% of VFTs reported obtaining financial benefits from inputs and services associated with training. A breakdown of the social benefits showed that VFTs ranked gaining confidence highest followed by increased social networks, improved social status and, fourth, exposure.

All VFTs host demonstrations which serve as training grounds. They had an average of seven practices in the demonstration plots. The majority of VFTs (95.3%) had demonstration plots of Napier, mucuna (83.7%), fodder shrubs (73.3%), and natural pasture improvement (70.9%). VFTs had disseminated about 10 technologies each. The technologies that had been disseminated by the highest number of VFTs were Napier grass and mucuna (100%), followed by fodder shrubs (98.8%), Rhodes grass (96.5%), and desmodium (94.2%) among many others. The least disseminated include tripsacum (10.5%), lucerne (8.1%), Nandi setaria (4.7%) and giant setaria (3.5%).

VFTs face many challenges while undertaking their dissemination activities, the most frequently mentioned was fare/transport followed by lack of training materials, limited technical knowledge, resistance to change by farmers and inadequate incentives. Opportunities for improving the performance of VFTs include provision of training materials, capacity building, and provision of incentives such as certificates, T-shirts, exchange visits and tours. Other opportunities include increased sensitization about the benefits of using improved feed technologies. On competence about livestock feed technologies, VFTs scored themselves highly on most practices. The results of the knowledge test administered to them showed that VFTs have generally a high understanding of practices they disseminate with an overall average score of 1.63 out of a score of 2. When data was disaggregated by gender, male VFTs had a higher mean score of 1.63 while females had 1.61. There was however no statistical difference between the competence level of male and female VFTs.

The attractiveness of the VFT approach led to its uptake by other organizations in Rwanda. Nine organizations (four dairy cooperatives, two food crop cooperatives, two government organizations, and one NGO) were identified that had adopted the VFT approach as a result of their exposure to it in EADD or to results of research on the approach. The organizations particularly appreciated that the approach allowed them to reach many more farmers than would otherwise be the case, while only slightly raising costs. In conclusion this study has demonstrated the important role VFTs play to meet the increasing demand for knowledge on fodder practices. This demand has increased as a result of the ‘one cow per poor family’ programme being run by the government of Rwanda. For VFTs to be more effective, challenges faced must be addressed. Future studies are needed of those trained by the trainers and of the importance of VFTs relative to other extension approaches.

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Acronyms and abbreviations

ACORD	Agency for Cooperation and Research in Development
CAHWs	Community Animal Health Workers
CGIAR	Consultative Group on International Agricultural Research
DFBAs	Dairy Farmers' Business Associations
DFGs	Dairy Farmer Groups
DUFACO	Dukorere Igihugu Dairy Farmers
EADD	East Africa Dairy Development Project
FFE	Farmer-to-Farmer Extension
FTA	Forests, Trees and Agroforestry
ICTs	Information Communication Technologies
IFPRI	International Food Policy Research Institute
LISP	Livestock Support Infrastructure Programme
MINAGRI	Ministry of Agriculture
MINALOC	Ministry of Local Government
NAEB	National Agriculture Export Board
NGOs	Non-governmental Organizations
PIM	Policies, Institutions and Markets
RAB	Rwanda Agricultural Board
RDCP	Rwanda Dairy Competitiveness Program
SMS	Subject Matter Specialist
SPSS	Statistical Package for Social Sciences
T&V	Training and Visit
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VFT	Volunteer Farmer Trainer

1.0 Introduction

Farmer-to-farmer extension (FFE) approaches have aroused considerable interest in the last decade in developing countries following the decline in government extension services. These approaches which are community based have been developed not only to deliver technologies, but also to help empower farmers to innovate and improve their capacities. In addition, they facilitate farmers to organize themselves for service provision and marketing (Christoplos 2010; David 2007). These extension models are demand driven, client-oriented, cost effective and efficient (Lukuyu et al. 2012; Wellard et al. 2013; Kiptot and Franzel 2014). They place farmers at the centre of knowledge generation and dissemination processes. They work on the assumption that farmers have the ability to spread innovations effectively due to their comprehensive local knowledge, use of the local language and location. One such community-based extension approach is the volunteer farmer trainer (VFT) approach, a type of farmer-to-farmer extension (FFE) model. FFE models have been widely practiced in many developing countries in different forms (Weinand 2002; Hellin and Dixon 2008; Ssemakula and Mutimba 2011; Lukuyu et al. 2012; Kiptot and Franzel 2014; Wellard et al. 2013). In Rwanda, VFTs are being used by the East Africa Dairy Development (EADD) project to disseminate information on livestock feed innovations.

The VFT approach is not new in Rwanda. It is recognized as one of the many pluralistic extension approaches that the government of Rwanda has embraced. Prior to 1994, the extension system in Rwanda was dominated by the government through the Ministry of Agriculture (MINAGRI) using a top down approach that included the (T&V) extension model that was introduced by the World Bank. After the 1994 genocide, both national and international NGOs began organizing farmers in groups and associations and providing them with extension advice and services. Most of these NGOs worked in isolation with little or no coordination or sharing of information among them. In order to revamp extension and provide adequate linkages between research, extension and the various actors in the sector, MINAGRI undertook a restructuring that led to the creation of the Rwanda Agricultural Board (RAB) and the National Agricultural Export Board (NAEB). The recent decision by the Government of Rwanda to decentralize agricultural extension activities to the Ministry of Local Government (MINALOC) aims at addressing efficiently specific needs of farm households within each district. This move along with a redeployment of staff, especially Subject Matter Specialists (SMS), should strengthen extension and enhance its role by

positioning staff closer to the people they are intended to serve. The current public agricultural extension, including MINAGRI at National/Zonal level and MINALOC at the district, Sector and Cell level, operate through offices in 30 districts, 416 sectors, 1500 cells and 14,876 villages. The widely accepted notion that extension should be provided through a pluralistic system that includes the public sector, international NGOs as well as private sector fits well with the government extension strategy (IFPRI 2011). The voluntary-based extension embraced by the government of Rwanda is a system of voluntary farmers providing agricultural extension services to their colleagues. This system is based on the following principles: 1) voluntary service-provider farmers are innovative people, with good communication skills, living in good relations with their neighbours and who agree to work voluntarily; 2) motivation for those farmers is trainings, study tours and awards received in agricultural competitions; and 3) each voluntary extension service provider agrees to assist at least five farmers in their own neighbourhood (MINAGRI 2009).

1.1 The Volunteer Farmer Trainer (VFT) Approach in the EADD Project

The EADD Project is implemented by a consortium of five partners led by Heifer International. The first phase of the project started its operations in 2008 and ended in 2012. The main objective was to double the incomes of 179,000 dairy farmers in Kenya, Uganda and Rwanda through improved dairy productivity along the dairy value chain. EADD works with dairy producer organizations commonly referred to as dairy farmers' business associations (DFBAs). In Rwanda, there are 17 DFBAs which are commonly referred to as dairy cooperatives. Each DFBA is composed of between 3000-10,000 members. Farmer training is organized at the village level using a group approach. To enhance and facilitate training, farmers come together to form what is commonly referred to as dairy farmer groups (DFGs). A DFG is composed of 15-20 members and forms the smallest training unit of the DFBA. It is at this level where most farmer training is organized, such training include topics on feeds and feeding system, breeding, animal health, milk quality, herd management, and group dynamics among others. The DFBA also provides various services to farmers, including: (1) bulking and selling of milk, providing income to farmers; and (2) technical support, artificial insemination for their animals and, in certain instances, credit under a 'check off' system, where inputs are provided and their costs are deducted from milk revenue.

The World Agroforestry Centre, the EADD partner leading the feeds and feeding systems component, initiated the VFT approach to facilitate the spread of livestock feed technologies.

As of December 2012, there were 92 VFTs that had been recruited in Rwanda (Kirui and Franzel 2013). The VFTs were selected through a participatory process involving their DFGs, dissemination facilitators and the DFBAAs using the following criteria:

- The ability to read and write
- The ability to interpret extension material to farmers
- Membership in a farmer organization or cooperative society working with the EADD Project
- Being a dairy farmer
- Having the willingness, interest and ability to disseminate new innovations and knowledge to others without pay
- Being a resident in the community
- Being willing to set aside land for setting up demonstrations.

After selection, VFTs were trained in feeds and feeding systems which included the establishment, management, improvement and utilization of pastures, fodder shrubs and herbaceous legumes. Other topics included feed conservation techniques such as silage making, hay baling, and management and utilization of crop residues. They were further supported to set up demonstration plots of various feed practices. These demonstration plots are used as training grounds. Project staff visited the VFTs from time to time and organized periodic training to improve their knowledge and skills. Some VFTs also had the opportunity to participate in educational tours to innovative farms. Once trained, VFTs trained other farmers within their DFGs and even other groups outside their villages. The schedule and content of training was decided upon after the VFTs consulted farmers in their DFGs. The trainings took place at the homestead of one of the farmer trainees, a demonstration site or at the farmer trainer's homestead.

1.2 Rationale of the study

While the EADD project has been able to achieve most of its targets using VFTs, not much is understood about the dissemination activities of the VFTs in Rwanda. If this approach is to be improved and scaled up, more information is needed about VFT motivation, technologies disseminated and opportunities and constraints experienced by VFTs as they undertake their activities, hence this study. In order to understand the dissemination activities of the VFTs, this study looked at various aspects: VFT motivation, training received on livestock feed

technologies, institutions that trained them, how farmers are mobilized, transport used, training venues, their competence level, the number of farmers reached, the number of feed technologies disseminated and the degree to which women are reached. In addition, factors influencing the performance of farmer trainers, challenges, opportunities and the spread of the VFT approach to other organizations were also assessed. It is expected that such information will assist development agencies to design extension programmes that are effective and sustainable.

1.3 Objectives of the study

1. Identify technologies disseminated by volunteer farmer trainers.
2. Assess the competence of volunteer farmer trainers.
3. Identify factors that motivate volunteer farmer trainers.
4. Identify challenges and opportunities experienced by volunteer farmer trainers.
5. Document cases of other organizations adopting the VFT approach, as a result of exposure to EADD and results of research on the approach.

Desmodium spp.

Forage sorghum

2.0 Methodology

2.1 Description of study sites

Rwanda is located in Central and East Africa between latitudes 1°04' and 2°51' south and longitudes 28°45' and 31°15' east. Its surface area is 26,338 km². The average population density in 2015 was 486 people per km². The climate is characterized by temperate conditions, especially in higher altitudes in the northwest of the country. Despite a relatively high rate of arability (40%), overall agricultural productivity remains low due to the stress of high population growth (5.49 children born per woman) and small land holdings. With a population of about 12.4 million inhabitants in 2015, Rwanda is the most densely populated country in Africa. Rwanda is a hilly country, with an average altitude of 1500-1700 m above sea level. Bordered by volcanoes to the north and rolling hills in a large part of the central plateau, it has earned the name of 'a country of a thousand hills.' To the east, where this study was undertaken, it is however relatively flat with altitudes well below 1500 m above sea level. Consequently, the climate of Rwanda, which according to her location is supposed to be tropical, is mild and cool due to the altitude. The altitude variation and the fragmented nature of the country have resulted in vast agro-biodiversity.

The administrative hierarchy of Rwanda is Province-District-Sector-Cell-Immidugudu (village). Rwanda has five provinces, which are followed by the districts that are responsible for coordinating public service delivery and economic development. Then, the districts are divided into sectors, which are responsible for the delivery of public services as mandated by the districts. The cells and villages (Immidugudu) are the smallest administrative units, providing a link between the people and the sectors. This study was undertaken in three districts, all in the eastern province: Rwamagana, Gatsibo and Nyagatare. These three districts mainly practice mixed farming with a free grazing system in Nyagatare. Farmers keep mainly Ankole cattle with a few crosses in Gatsibo and Rwamagana. A semi-grazing system is practiced in Gatsibo while farmers in Rwamagana practice stall feeding with some grazing.

Cross breed cows

An Ankole cow

2.2 Sampling and selection of volunteer farmer trainers

All 89 of the volunteer farmer trainers in the three districts were selected for interview. The distribution of the interviewed trainers among the three districts and 17 farmer cooperative societies is shown in Table 1. Gatsibo has four farmer cooperatives; Nyagatare, seven and Rwamagana, six. During the time of the study, the EADD project had recruited 89 VFTs (Between 3-9 per dairy cooperative). Due to illnesses and attrition, only 86 VFTs were interviewed and their locations are shown in Figure 1.

Figure 1: Map of Rwanda showing interview locations

Table 1: Distribution of VFTs interviewed from different cooperatives

Cooperative	District			Total
	Gatsibo	Nyagatare	Rwamagana	
	# of farmers			
Cooperative de Development Delevage	4	0	0	4
Murambi Dairy Cooperative	5	0	0	5
Kibondo Dairy Farmers Cooperative	5	4	0	9
Kiziguro Dairy Farmers Cooperative	5	0	0	5
Nyagatare Dairy Marketing Cooperative	0	7	0	7
Mbare/Terimbera Mworozu Dairy Cooperative	0	6	0	6
Isangano Dairy Farmers Cooperative	0	3	0	3
Rwabiharamba Dairy Farmers Cooperative	0	5	0	5
Kirebe Kamatezirakamwa	0	3	0	3
Matimba Tworore Kijyambere	0	4	0	4
Cooperative D'agri-elevage de Gahengeri	0	0	2	2
Dukundamatungo	0	0	5	5
Koamusha/Koperative Y'aborozu ba Musha	0	0	6	6
Cooperative de Collecte du Lati Rubona	0	0	6	6
Kamirabose/Muhazi	0	0	8	8
Dukorere Igihugu Dairy Farmers (DUFACO)	0	0	8	8
Total	19	32	35	86

2.3 Methods of data collection

Formal survey using a structured questionnaire

Collection of data was through a formal survey that was conducted by interviewing individual farmer trainers using a structured questionnaire. The questionnaire was developed following an informal exploratory survey that had earlier been undertaken to identify issues to be used to formulate hypothesis for the formal survey. The structured formal survey was therefore formulated based on the perceptions given by farmer trainers during the informal survey. The formal survey was purposively used in this study in order to capture quantitative data that would enable us understand the factors that influence farmer trainers' performance, their competence level, motivations, challenges and opportunities so that we could come up with strategies to further improve the effectiveness of the VFT approach.

Before the questionnaire was administered, the training of enumerators was conducted. This was to ensure that they understood the questions and what was expected of them. After training, a pre-test was conducted with a small sample of farmer trainers. This was necessary so as to ensure that the enumerators and respondents understood the questions, the enumerators were filling out the responses correctly and to ensure that respondents were able and willing to provide the needed information. Interviews were conducted at the homestead of the farmer trainer during August, 2012.

Assessment of other organizations adopting the volunteer farmer trainer approach

We asked a wide range of contact persons in government, NGOs and cooperatives whether they knew of organizations that had taken up the VFT approach primarily because of exposure to the EADD VFT programme or to the results of research on the approach. Through exploring contact persons in various government department and NGOs, we identified nine such organizations: six cooperatives (four dairy, one maize and one potato cooperative), two government organizations, and one NGO. A checklist was developed for interviewing representatives of these organizations and interviews were conducted in 2015, six years after the start of the VFT programme and two years after EADD ended.

Benjamin Nzigamasibo interviewing a female VFT at her homestead

Claude Ruganirwa interviewing a young VFT

2.4 Data entry, analysis and presentation

Data was entered in SPSS. Variables from households and individual farmer trainer characteristics were assessed to capture relevant information from respondents. Descriptive statistics such as frequency counts, percentages, mean, and standard error of mean were used to display the data. To assess farmer's competence level, a knowledge test was undertaken.

Twenty questions related to feeds and feeding technologies were formulated and respondents asked any 10 questions. The selection of questions asked depended on the livestock feed technologies the farmer trainer had learnt and disseminated to other farmers. Scores were given as shown in Table 2.

Table 2: Scores for assessing competence level

Competence level	Score
Incorrect answer	0
Half correct answer	1
Correct answer	2

The total score for the respondent is obtained by summing up the score obtained on each practice. The minimum score one could obtain was 0 and maximum 20. The competence level of the respondents was measured by using the formula below:

Knowledge index = Respondent's total score/Total possible score. The highest possible knowledge index is 1.

Ranking and ratings were also used. Farmer trainers were asked in some cases to simply put various alternatives in order of importance, value or preference. Ratings were done in some cases to give different alternatives some weighting, using a 3-point Likert scale where 3 was considered highest with 1 the lowest. In other cases farmer trainers were asked to assess their own competence level on a 1-5 scale with 1 being the lowest and 5 the highest. Mean ratings for a farmer's competence level per technology were computed and presented.

3.0 Results

3.1 Demographic characteristics of respondents

Of the VFTs interviewed, 76.7% were men and 23.3%, women. The women were about one third of the sample size. About 22%, 37.2% and 40.6 % of VFTs were from Gatsibo, Nyagatare and Rwamagana districts respectively. The VFTs were middle-aged; about 43.3 years old, with an average of about 46.9 years and 48.4 years respectively for men and women. All VFTs had basic education with an average of 10.7 years of schooling. Male VFTs had slightly more years of schooling than their female counterparts (Table 3). This was significant at $P < 0.05$. Few farmers (less than 3%) did not have any education (Table 3). All VFTs belonged to farmer groups, the average number being 1.4 with no significant difference between men and women. As for dairy experience, male VFTs had more years of dairy experience than their female counterparts (13.5 vs. 9.6) with no significant differences. In relation to marital status, slightly over 90% were married, with a few cases of widows and unmarried VFTs. Apparently there were no widowers or divorcees. It is frowned upon in the African tradition for one to divorce.

Table 3: Characteristics of respondents by gender

	All respondents (n=86)	Male (n=66)	Female (n=20)
Average age (years)	43.3 (1.13)	46.9 (1.28)	48.4 (2.42)
Education** (no. of years)	10.7 (0.31)	11.1 (0.3)	9.0(0.7)
No. of years of dairy experience	12.6 (1.08)	13.5 (1.28)	9.6 (1.89)
Group membership (%)	100	100	100
No. of groups	1.4 (0.07)	1.4 (0.09)	1.3(0.15)
Marital status			
Married (%)	92	94	85
Widowed (%)	2	0	7
Unmarried (%)	6	6	5
Divorced (%)	0	0	0

Significance level ** $p < 0.05$

Figures in parenthesis are standard errors of mean

3.2 Socio-economic characteristics of households

Size of land and type of housing

There were 87.2% male-headed households (MHH) with the rest being female headed. The average land size was 6.4 hectares with MHH having more land than their female counterparts (Table 4). In relation to the type of houses, 97% of houses had corrugated iron sheets with the rest having tiled roofs. Most households (86%) had walls made of bricks. This is an indication that the VFTs interviewed were of average levels of income, and generally dairy farmers fall in the middle-income level category.

Table 4: Socio-economic characteristics of the households

	All HH (n=86)	Male HH (n=75)	Female HH (n=11)
Land size (ha)	6.4 (0.73)	6.7(0.81)	4.1 (1.2)
Type of house (roof)			
Corrugated iron sheets (%)	97	100	90.9
Tiles (%)	1.1	0	9.0
Type of house (wall)			
Mud (%)	5.8	4	18
Bricks (%)	86	86.6	81.8
Stone (%)	3.4	4	0
Timber (%)	4.6	5.3	0

Livestock ownership

VFTs owned different types of livestock with an average of 7.6 dairy cows, with those in MHH having a higher number than those from female-headed households (8.0 vs.4.6). This was significant at $p>0.1$ (Table 5). Other livestock owned included calves, beef cattle, goats, sheep, poultry and rabbits.

Livelihood sources

VFTs had various sources of livelihood. Almost all of them (98.8%) were involved in dairy farming as a source of livelihood; this was followed by cash cropping, subsistence farming and off-farm labour (Table 6). Between 10-30% of VFTs were involved in small-scale trade, poultry and apiculture. Less than 10% of VFTs received a pension while others received remittances from relatives working in urban areas and abroad.

Table 5: Type and number of livestock owned

	All HH (n=86)	MHH (n=75)	FHH (n=11)
Dairy cows***	7.6 (0.8)	8.0 (1.0)	4.6 (1.1)
Calves	3.6 (0.4)	3.7 (0.5)	2.8 (0.8)
Beef cattle	1.3 (0.2)	1.4 (0.2)	0.6 (0.3)
Goats	3.5 (0.9)	3.6 (0.9)	2.6 (1.1)
Sheep	0.8 (0.2)	0.8 (0.3)	0.4 (0.4)
Poultry	3.3 (0.6)	3.4 (0.7)	2.2 (1.6)
Rabbits	0.2 (0.1)	0.2 (0.1)	0.0 (0.0)
Pigs*	0.1 (0.1)	0.1 (0.08)	0.0 (0.0)

Significance level *** p<0.01; * p<0.1

Figures in parenthesis are standard errors of mean

Table 6: Percentage of VFTs involved in different livelihood sources

	All (n=86)	Gatsibo (n=19)	Nyagatare (n=32)	Rwamagana (n=35)
Dairy farming	98.8	94.7	100.0	100.00
Cash cropping	88.4	94.7	81.3	91.43
Subsistence	87.2	73.7	100.0	82.9
Off-farm labour	70.9	78.9	84.4	54.29
Horticulture	65.1	57.9	65.6	68.57
Small-scale trade	25.6	31.6	31.3	17.14
Poultry	20.9	0.0	15.6	37.14
Apiculture	10.5	5.3	9.4	14.29
Pension	7.0	21.1	3.1	2.86
Remittances	7.0	10.5	9.4	2.86
Employed	3.5	0.0	3.1	5.71
Beef farming	3.5	0.0	9.4	0.00
Sheep/goat rearing	2.3	0.0	3.1	2.86
Fish farming	1.2	0.0	3.1	0.00

Most livelihood sources cut across the districts where the study was conducted except poultry, employment, beef farming, sheep/goat rearing and fish farming. Poultry was not found in Gatsibo district. None of the VFTs interviewed from Gatsibo district are employed nor do they practice beef and fish farming, or sheep and goat rearing. Actually, fish and beef farming are only practiced in Nyagatare district.

3.3 Motivation

The majority of VFTs (99%) said that their main motivation to become volunteers was to gain knowledge of and skills on improved dairy feed technologies. This was followed by altruism which was mentioned by 79% of VFTs (Table 7). Another 58% of VFTs mentioned project benefits that they receive by being trainers. These include going for tours and exchange visits. About 36% mentioned social benefits such as fame/popularity which they indicated may be a springboard to leadership positions within the community or even nationally which improves their social status in the community. Few VFTs (6%) mentioned income that they anticipated receiving from selling inputs and services associated with their dissemination activities.

Table 7: Percentage of volunteer farmer trainers and mean scores on reasons that motivated them to become trainers

Motivation	% of VFTs	All VFT		Male VFT		Female	
						VFT	
		Score	SE	Scores	SE	Scores	SE
Gain knowledge/skills	99	2.5	0.08	2.5	0.09	2.6	0.15
Altruism	79	2.0	0.08	2.0	0.09	2.1	0.16
Social benefits	36	1.7	0.12	1.7	0.73	1.4	0.24
Project benefits	58	1.8	0.11	1.8	0.13	1.6	0.20
Income	6	1.4	0.4	1.7	0.67	1.0	0.0

Respondents were further asked to rate the importance of the reasons that motivated them to become VFTs on a Likert scale of 3-1 where 3 = very important; 2 = important and 1 = least important. The highest rating was for gaining knowledge/skills (2.5), followed by altruism (2.0), project benefits (1.8), social benefits (1.7) and income (1.0). The ratings corroborated the frequency results. Both men and women VFTs were highly motivated by gaining knowledge and skills, followed by altruism and project benefits. However, women had higher scores than their male counterparts on gaining knowledge and skills and altruism. Men had higher scores on project benefits, social benefits and income.

Motivation to continue training

VFTs were further asked to give reasons that motivate them to continue training other farmers in view of the fact that some of them dropped out. Furthermore, they do not receive a salary. The majority (92%) mentioned knowledge and skills. This was followed by altruism and a new motivation; the increased demand for training came third (Table 8) because as they train, more and more farmers become aware of their services. There was no change in the percentage of farmers who mentioned social benefits. There was however an increase in the proportion who mentioned income from 6% to 15% (Figure 2) and a drop in the proportion of those VFTs who mentioned project benefits. The reasons for this were not explored.

Table 8: Percentage of farmer trainers and mean scores on reasons that motivate them to continue training

Motivation	% of FTs	All FTs		Male FTs		Female FTs	
		Scores	SE	Scores	SE	Scores	SE
Gain knowledge/skills	92	2.2	0.08	2.2	0.1	2.3	0.19
Altruism	78	1.8	0.08	1.8	0.09	1.9	0.14
Social benefits	36	1.7	0.12	1.5	0.12	2.2	0.3
Project benefits	28	2.0	0.11	2	0.16	2.0	0.26
Income	15	1.7	0.23	1.8	0.26	1.0	0
Increased demand for training	70	2.4	0.11	2.3	0.13	2.6	0.2

Figure 2: Comparison between motivation to become a trainer and to continue training

Further analysis of the importance attached to the reasons was undertaken whereby VFTs were asked to rate the reasons based on a Likert scale of 3-1. The findings revealed that demand for training was rated highly (2.4), followed by gaining knowledge, and project benefits came third overall. Female VFTs scored higher than their male counterparts on all except project benefits and income. Income was the least scored by both male and female VFTs.

Social benefits

The social benefits that VFTs receive as a result of their dissemination activities were further classified into four categories. They include exposure (getting an opportunity to see/learn new technologies), gaining confidence, increased social networks and improved social status. A pair-wise matrix ranking exercise undertaken by VFTs revealed that gaining confidence ranked highest, followed by increased social networks, improved social status and fourth ranked was exposure (Table 9). Disaggregating data by gender, shows that confidence is the most important social benefit for women VFTs, whereas increased social networks is the most important social benefit for men VFTs (tables 10 and 11).

Table 9: Pairwise matrix ranking of social benefits

Social benefits	Ranking of the social benefits				Total	Score*	Overall rank
	1	2	3	4			
	Frequency						
Exposure	17	37	4	28	86	301	4
Gaining confidence	62	21	2	1	86	401	1
Increased social networks	36	34	11	5	86	359	2
Improved social status	22	41	21	2	86	341	3

Table 10: Pairwise matrix ranking of social benefits by men VFTs

Social benefits	Ranking of the social benefits				Total	Score*	Overall rank
	1	2	3	4			
	Frequency						
Exposure	13	30	2	21	66	233	4
Gaining confidence	50	15	1	1	66	313	2
Increased social networks	29	25	8	4	66	590	1
Improved social status	16	34	15	1	66	263	3

Table 11: Pairwise matrix ranking of social benefits by women VFTs

Social benefits	Ranking of the social benefits				Total	Score*	Overall rank
	1	2	3	4			
	Frequency						
Exposure	4	7	2	7	20	68	4
Gaining confidence	12	6	1	1	20	175	1
Increased social networks	7	9	3	1	20	82	2
Improved social status	6	7	6	1	20	78	3

Income

Only 12.8 % of VFTs reported receiving financial benefits from inputs and services associated with training. These include sale of mucuna, lablab, Rhodes grass and Nandi setaria seed. Others include the sale of cuttings for Brachiaria spp and Napier, hay and making silage.

Table 12: Percentage of VFTs who received income associated with training

Service/technology	#of VFTs	Unit cost	Mean price per unit (Francs)	SD
Mucuna seeds	7	kg	1414	801
Lablab seeds	3	kg	1500	500
Rhodes grass seeds	2	kg	8000	2828
Nandi setaria	1	kg	100	1.27
Brachiaria spp cuttings	1	1m	10	-
Napier cuttings	1		1000	
Rhodes grass hay	1	tonne	120	-
Brachiaria spp hay	1	tonne	120	
Silage making	1	day	1000	

3.4 Training

Training received by VFTs

VFTs were asked whether they had any professional training in any agricultural-related field, that is, training at the diploma or certificate level. About 21 % of VFTs have professional training. Disaggregating data by gender shows that 25.8% of male VFTs and 20.9% of their female counterparts have professional training (Table 13). The agricultural-related fields are: agriculture, veterinary science, animal science/livestock production and forestry.

Table 13: Percentage of VFTs with professional training

Gender		Highest professional qualification	
		Certificate (%)	Diploma (%)
Male VFT (n=66)	Agriculture	9	2
	Veterinary	9	5
	Animal science/Livestock production	9	0
	Forestry	2	0
Female VFT (n=20)	Animal science/Livestock production	5	0
All VFT (n=86)	Agriculture	7	1
	Veterinary	7	3
	Animal science/Livestock production	8	0
	Forestry	1	0

How training needs of VFTs on livestock feed technologies are identified

The training needs of VFTs are identified mostly through consultations with the dissemination facilitators (70%) while in certain cases they are decided by the project (29%) (Figure 3)

Figure 3: Percentage of VFTs who mentioned different approaches for identifying their training needs

Training in livestock feeds and feed technologies

VFTs were asked whether they had received any training in livestock feeds and feed technologies. All of them had received training in different livestock feed technologies with the majority of them having been trained on mucuna, followed by calliandra, Napier and silage making (Figure 4). VFTs have mostly been trained by EADD and the local government (Table 14). Napier grass has mainly been taught to VFTs by the local government while EADD has taught VFTs mostly on mucuna, calliandra and silage making. Mucuna was the most taught topic followed by calliandra and Napier grass (Table 14). Least taught was tripsacum, lucerne and sweet potato vines. Other institutions that have trained VFTs are Umutara Polytechnique University, Rwanda agricultural board and NGOs such as care, ACORD and Heifer International among others shown in Table 10. VFTs have been trained several times on various topics. The majority of VFTs have been trained two times on calliandra, mucuna, lablab, crop residues and desmodium (Table 15). A few VFTs have been taught 3, 4, 5, 6 and even 7 times on some topics. One VFT had received training 7 times on rain water harvesting technology.

Desmodium spp.

Calliandra

Rhodes grass

Table 14: Percentage of VFTs who have been trained on various dairy feed technologies by various institutions

	Sponsor institution												% all VFTs
	EADD	Umutara polytechnique university	ACORD	CARE	Local government	Rwanda agricultural board	SASHA	PDEM	Land O Lakes	PDRCIU	ISAR	Heifer international	
		Frequency											
Mucuna	70	0	1	0	0	1	0	0	0	0	0	0	83.7
Lablab	50	0	0	0	0	0	0	0	0	1	0	0	59.3
Chloris	56	0	0	0	0	0	0	0	0	0	0	0	65.1
Calliandra	69	1	0	0	0	0	0	0	0	0	0	1	82.6
Leauceana	33	0	1	0	0	0	0	0	0	0	0	0	39.5
Crop residues	50	0	1	0	2	0	0	0	0	0	0	1	62.8
Silage making	64	2	0	0	2	0	0	1	1	0	0	0	81.4
Desmodium	51	0	0	2	0	1	0	0	0	0	0	0	62.8
Hay making	62	3	1	0	0	0	0	0	0	1	0	0	77.9
Ratio formulation	50	3	0	0	1	3	0	1	0	0	0	0	67.4
Napier	28	1	1	0	31	3	0	0	1	0	1	4	81.4
Natural pasture improvement	20	0	0	0	9	0	0	0	0	0	0	0	33.7
Sweet potato vines	4	0	0	0	0	0	1	0	0	0	0	0	5.8
Rain water harvesting technology	11	0	0	0	4	1	0	0	0	0	0	0	18.6
Bracharia spp	13	0	0	0	0	0	0	0	0	0	0	0	15.1
Tripsacum spp	0	0	0	0	1	0	0	0	0	0	0	0	1.2
Lucerne	1	0	0	0	0	0	0	0	0	0	0	0	1.2
TOTAL	632	10	5	2	50	9	1	2	2	2	1	6

Figure 4: Percentage of VFTs who have been trained on various topics

Table 15: Number of times VFTs have received training

Topic	Number of times						
	1	2	3	4	5	6	7
Mucuna	10.5	55.8	11.6	2.3	2.3	1.2	0
Lablab	0.0	48.8	7.0	2.3	1.2	0.0	0
Chloris	5.8	33.7	11.6	1.2	1.2	0.0	0
Calliandra	9.3	57.0	8.1	2.3	5.8	0.0	0
Leauceana	3.5	29.1	3.5	0.0	2.3	1.2	0
Crop residues	3.5	47.7	8.1	1.2	0.0	2.3	0
Silage making	30.2	39.5	9.3	0.0	2.3	0.0	0
Desmodium	5.8	44.2	9.3	1.2	2.3	0.0	0
Hay making	27.9	37.2	9.3	0.0	2.3	1.2	0
Ratio formulation	11.6	39.5	14.0	2.3	0.0	0.0	0
Rhode grass	0.0	9.3	2.3	0.0	0.0	0.0	0
Napier	2.3	34.9	22.1	2.3	14.0	5.8	0
Natural pasture improvement	7.0	12.8	8.1	3.5	2.3	0.0	0
Sweet potato vines	2.3	2.3	1.2	0.0	0.0	0.0	0
Rain water harvesting technology	4.7	9.3	1.2	2.3	0.0	0.0	1.2
Brachiaria spp	4.7	9.3	1.2	0.0	0.0	0.0	0
Tripsacum spp	0.0	0.0	0.0	0.0	0.0	1.2	0
Lucerne	0.0	1.2	0.0	0.0	0.0	0.0	0

3.5 Dissemination activities

VFTs interviewed had served for about 42.5 months. The median and mode were 48 and the minimum and maximum were 12 and 48 months respectively. Further analysis revealed that the majority (84.8%) had served between 31 and 48 months. Slightly less than 10% had served between 21 and 30 months while a minority (5.8%) between 12 and 20 months. These are VFTs who were recruited much later to replace the ones who had dropped out.

Disaggregating data by gender showed that men had served much longer than women (43.8 vs. 38.4). This was significant at $p > 0.1$. VFTs cover an average distance of 7.6 km a day, of which men cover an average of 8.8 km while women cover an average of 4.0 km. This was significant at $p < 0.01$ (Table 16). There are some VFTs who go out of their way to train farmers outside their own villages. Farmer trainers cover an average of 4.4 villages apart from their own. There was no difference in the number of villages covered by men and women.

During both dry and wet seasons, VFTs train an average of 2.7 times a month. There was no difference between men and women on the number of times they train during the dry season. However, during the rainy season, women VFTs cover fewer villages than men (2.5 vs. 2.7). On the days VFTs train, they spend on average, about 1.5 hours per day. Women spent less time, an average of 1.5 hours, while men spent slightly more time, at an average of 1.6 hours. Twenty-four farmers were trained per month by VFTs. The mode and medium were 20 and the minimum was 2; the maximum was 150. About 24.7% of VFTs trained between 1 and 10 farmers per month, 37.6% trained 11-20; 7.1% trained 31-50; 3.5% between 51-100 and a minority (1.2%) trained 101-150 farmers per month. Women VFTs trained more farmers per month than their male counterparts (29.2 vs. 22.4). The difference was not statistically significant. Total number of farmers trained was 217, out of which 110 were male farmers with a median of 92, and 107 female farmers with a median of 75. Disaggregating data by gender shows that both female and male VFTs had trained more male farmers than female farmers but the difference in both cases was not statistically significant. In terms of the numbers trained, female VFTs have trained fewer male and female farmers than their male counterparts but again, the difference was not statistically significant. In terms of monitoring progress, most VFTs (98.8%) made follow up visits. Among the ones that made follow up visits, 64.1% indicated that they did it as part of their duties while 35.9% did it after receiving requests from farmers.

Table 16: Descriptive statistics on the dissemination activities undertaken by VFTs

Variables	All VFTs (n=86)		Female VFTs (n=20)		Male VFTs (n=66)	
	Mean	SE	Mean	SE	Mean	SE
Length of time served as farmer trainers* (months)	42.5	1.05	38.4	2.93	43.8	1.00
Longest distance covered*** (km)	7.6	0.02	4.0	0.60	8.8	1.02
No. of villages covered outside their own	4.4	0.35	4.4	0.75	4.4	0.40
Number of times per month VFT trains during the dry season	2.7	0.09	2.7	0.18	2.7	0.10
Number of times per month VFT trains during the rainy season	2.7	0.09	2.5	0.17	2.7	0.10
Time (hrs) spend on dissemination	1.5	0.07	1.5	0.15	1.6	0.09
Number of male farmers trained	110	8.3	107.	23.4	110.5	8.1
Number of female farmers trained	107	12.1	82.6	14.9	114.2	15.1
Farmers trained per month	24	2.4	29.2	7.1	22.4	2.3
Total number of farmers trained	217	17.50	107	37.5	110	140

Notes: Significance level * $p < 0.10$, *** $p < 0.01$

Mode of training and how farmers' training needs are identified

About 95% of VFTs used the group approach, while 5% used the individual approach when training. The training needs of farmers were mostly decided by the VFTs while slightly fewer than half of the VFTs consulted with farmers. A minority of the needs were identified by project officials (Figure 5).

Figure 5: How the training needs of farmers are identified

Mode of transport owned and used by VFTs

About 41% of VFTs owned bicycles and 40% motorcycles. Slightly less than a quarter of the VFTs did not own any mode of transport. More men than women owned bicycles and motorcycles. Most women (60%) did not own any mode of transport (Table 17). This has implications on the dissemination activities. Over 95% of VFTs travelled on foot, 46.5 % used their own bicycles; 39.6 hired motorcycles while 32.5% use hired bicycles, among other modes of transport. Very few farmers used public transport. Disaggregating data by gender shows that all women VFTs just walk, compared to 95.5% of their male counterparts. None of the women used public transport (Table 18). Slightly over half of the male VFTs used their own bicycles while about a third used hired motorcycles (Table18).

Table 17: Type of transport owned by VFTs

Transport owned	Overall %	% Male (n=66)	% Female (n=20)
Bicycle	40.9	45.5	25
Motorcycle	39.5	43.9	25
None	24.4	13.6	60

Table 18: Mode of transport used by VFTs

Mode of transport used	Overall % of VFTs	% by gender	
	N=86	Male (n=66)	Female (n=20)
Foot	96.5	95.5	100
Hired motorcycle	39.5	37.8	45
Public transport	1.2	1.5	0
Own bicycle	46.5	54.5	20
Own motorcycle	20.9	25.7	5
Hired bicycle	32.5	9.0	69

In order to find out the most commonly used mode of transport, VFTs were asked to rank the types of transport they mostly used with 1 = most frequently used, 2 = moderately use; 3 = least frequently used. The most frequently used mode of transport was by foot, followed by own bicycle and third was hired motorcycle, a common mode of transport in the rural villages of Rwanda (Table 19).

Table 19: Ranking of three most frequently used modes of transport

Transport	Ranking of the first three most frequently used (# of FTs)			Total frequency	Total score	Overall rank
	Most frequently used	Moderately used	Least frequently used			
Foot	34	39	10	83	356	1
Hired motorcycle	14	6	14	34	136	3
Own bicycle	20	18	2	40	178	2
Public transport	0	0	1	1	3	6
Own motorcycle	13	3	2	18	83	5
Hired bicycle	4	16	8	28	108	4

Mobilization of farmers for training

VFTs were asked how they mobilized farmers for training. About 95.3% mentioned local authorities and DFG leaders. This was followed by the use of cell phones and publicizing through public gatherings. Poster adverts was the least used (Table 20).

Table 20: Percentage of farmers who use different methods for mobilizing farmers

How farmers are mobilized	% of all N=86	% male VFTs (n=66)	% of female VFTs (n=20)
Publicize through local authority and DFG leaders	95.3	95.4	95
Use of cell phones	94.2	93.9	95
Publicize through public gatherings	84.9	86.3	80
Door to door	55.8	56	55
Milk transporters	43.0	45.5	35
Training sessions	7.0	9.0	0
Poster adverts	3.5	1.5	1.0

Table 21: Rating of frequently used methods of mobilizing farmers

How farmers are mobilized	All VFT	Male VFTs	Female VFTs
	Mean scores		
Use of cell phones	2.2 (0.09)	2.1 (0.10)	2.4 (0.192)
Publicize through local authority and DFG leaders**	2.1 (0.08)	2.3 (0.094)	1.7 (0.172)
Publicize through public gatherings	2.0 (0.08)	2.0 (0.10)	2.1 (0.93)
Door to door	1.8 (0.1)	1.7 (0.10)	2.0 (1.0)
Poster adverts	1.7 (0.66)	1.0	-
Milk transporters	1.7 (0.14)	1.8 (0.16)	1.6 (0.29)
Training sessions	1.2 (0.14)	1.2 (0.17)	-

Figures in parenthesis are standard errors of mean

** Significant at $p < 0.05$

Volunteer farmer trainers were further asked to score the most frequently used method of mobilizing farmers for training. Rating was on a 3-point Likert scale where 3 = most important; 2 = important and 1 = least important. The use of cell phones scored highest followed by publicizing through local authorities and DFG leaders; third was public gatherings (Table 21). In relation to gender, female VFTs used mobile phones much more than their male counterparts who used local authorities and DFGs the most frequently. There were significant differences between the scores of male and female VFTs on one method: publicizing through a local authority and DFGs. This was significant at $p > 0.05$.

Venues for holding training sessions

Public venues were the most mentioned place for holding training sessions by 97.7% of VFTs. These included churches, schools and market centres. This was followed by demonstration sites and farmers' homesteads (Figure 6). The trend was the same for both men and women VFTs.

Figure 6: Venues where VFTs hold training sessions

To further understand the venues that are most frequently used, VFTs were asked to score the venues on a 3-point Likert scale where 3 = most frequently used; 2 = moderately used; 1 = least used. Findings show that public venues scored highest (2.3) followed by farmers' homesteads and third was the VFTs homestead (Table 22). Disaggregating data by gender shows that there was a difference between male and female VFTs on the highest scored venue. Male VFTS scored public venues and farmers' homesteads as their highest, whereas female VFTs scored farmers' homesteads higher than other venues. Demonstration sites were scored second by female VFTs.

Table 22: Rating of the most frequently used venues

Venues	All VFT	Male VFT	Female VFT
Public venues	2.3 (0.08)	2.3 (0.87)	1.6 (0.10)
Demonstration sites	1.7 (0.09)	1.6(0.10)	1.8 0.19)
VFTs' homesteads	1.8 (0.17)	1.9 (0.23)	1.6 (0.10)
Farmers' homesteads	2.2 (0.20)	2.3 (0.09)	2.0 (0.20)

Figures in parenthesis are standard errors of mean

A farmer's homestead

Kirebe milk collection centre

Farmers attending training at the milk collection centre

Reference materials

About 76.7% of VFTs had reference materials, such as brochures, leaflets and books. Out of these, 80.3 % and 65% are male and female VFTs respectively. Of those VFTs who had reference materials, 25.8% mainly shared with other farmers while the majority (74.2%) mainly used them as reference materials.

Type of costs incurred by volunteer farmer trainers

The type of costs incurred by VFTs when undertaking their dissemination activities are shown in Table 23. The most frequently mentioned cost is cell phone air time (96.5%), followed by transport and opportunity cost for family labour. The least mentioned is the cost of meals and snacks. This is only incurred if they train far from their homes. VFTs spent their own money on training materials such as manila paper, sample seeds and marker pens.

Table 23: Percentage of VFTs incurring various costs

Type of costs incurred	All (n=86)	Male (n=66)	Female (n=20)
Cell phone airtime	96.5	95.5	100.0
Transport	91.9	92.4	90.0
Opportunity time for family labour	88.3	87.9	90.0
Training materials	44.2	47.0	35.0
Vehicle and bicycle maintenance	29.1	30.3	25.0
Cost of meals and snacks	4.7	4.5	5.0

Livestock feed practices disseminated by VFTs

All VFTs interviewed had disseminated practices such as mucuna and Napier grass. Other practices that had been disseminated to farmers by over 80% of VFTs were fodder shrubs, Rhodes grass, lablab, desmodium, sweet potato vines and natural pasture improvement (Table 24). Practices that had been disseminated by less than 10% of VFTs include *Tripsacum* spp, lucerne, Nandi setaria and giant setaria. A higher proportion of female VFTs had disseminated fodder shrubs, desmodium, sweet potato vines, conservation of crop residues and lucerne compared to their male counterparts. Actually all the female VFTs had disseminated Napier grass, mucuna, fodder shrubs and desmodium.

Table 24: Percentage of VFTs who have disseminated various practices

Practices	% of volunteer farmer trainers		
	All (N=86)	Male (N=66)	Female (N=20)
Napier grass	100.0	100.0	100.0
Mucuna	100.0	100.0	100.0
Fodder shrubs	98.8	98.5	100.0
Rhodes grass (<i>C.gayana</i>)	96.5	97.0	95.00
Lablab	96.5	97.0	95.0
Desmodium	94.2	92.4	100.0
Sweet potato vines	84.9	83.3	90.0
Natural pasture improvement	82.6	87.9	65.0
Conservation of crop residues	65.1	59.1	85.0
Feed formulation and rationing	48.8	45.5	60.0
Silage making	39.5	40.9	35.0
Brachiaria spp	29.1	27.3	35.0
Hay making	27.9	31.8	15.0
Tripsacum spp	10.5	12.1	5.0
Lucerne	8.1	7.6	10.0
Nandi setaria	4.7	4.5	5.0
Giant setaria	3.5	3.0	5.0

Demonstration plots hosted by VFTs

Demonstration plots on farm play an important role in technology dissemination. One of the criteria for selection of VFTs was that they had to be willing to set aside land for demonstrations. Most VFTs host demonstrations which serve as training grounds for farmers. As such, it was important to find out whether VFTs had demonstrations of various technologies on their farms. VFTs host about seven practices in the demonstration plots. The majority of VTs (95.3%) had demonstration plots of Napier grass, mucuna (83.7%), fodder shrubs (73.3%) and natural pasture improvement (fencing, weed removal, over sowing)(70.9%). There were however some technologies that reached only a handful of farmers (less than 20%) with demonstrations. These included Brachiaria spp. (8.1%), lucerne and Tripsacum spp. (5.8%), Nandi setaria (3.5%) and giant setaria (1.2%).

Table 25: Percentage of VFTs with demonstration plots

Practices	All (n=86)	Male (n=66)	Female (n=20)
Napier grass	95.3	95.5	95
Mucuna	83.7	84.8	80
Fodder shrubs	73.3	72.7	75
Natural pasture improvement	70.9	74.2	60
Sweet potato vines	69.8	68.2	75
Rhodes grass	65.1	66.7	60
Lablab	61.6	63.6	55
Desmodium	54.7	53.0	60
Brachiaria spp.	8.1	7.6	10
Lucerne	5.8	4.5	10
Tripsacum spp.	5.8	7.6	0
Nandi setaria	3.5	4.5	0
Giant setaria	1.2	1.5	0

Calliandra hedge

Desmodium spp.

Napier grass

Uptake of the technologies by VFTs

Some VFTs have moved beyond having demonstration plots and expanded/taken up the technologies. For example, 96.5% of VFTs had expanded Napier grass on their farms, 84.9% mucuna, 74.4% fodder shrubs and sweet potato vines, 70.9% natural pasture improvement among other technologies (Table 26). Technologies that had been expanded by less than 10% of the VFTs were *Brachiaria* spp, Lucerne, *Tripsacum* spp, Nandi setaria and giant setaria. None of the female VFTs had taken up *Tripsacum* spp, Nandi setaria and giant setaria.

Table 26: Percentage of VFTs who had taken up livestock feed technologies

Technologies	All (N=86)	Male (N=66)	Female (N=20)
Napier grass	96.5	95.5	100.0
Mucuna	84.9	84.8	85.0
Fodder shrubs	74.4	72.7	80.0
Sweet potato vines	74.4	72.7	80.0
Natural pasture improvement	70.9	74.2	60.0
Rhodes grass	65.1	66.7	60.0
Lablab	62.8	63.6	60.0
Conservation of crop residues	61.6	57.6	75.0
Desmodium spp.	58.1	56.1	65.0
Feed formulation and rationing	48.8	45.5	60.0
Silage making	22.1	22.7	20.0
Hay making	15.1	18.2	5.0
<i>Brachiaria</i> spp.	8.1	7.6	10.0
Lucerne	7.0	6.1	10.0
<i>Tripsacum</i> spp.	5.8	7.6	0.0
Nandi setaria	3.5	4.5	0.0
Giant setaria	1.2	1.5	0.0

3.6 Challenges and opportunities

VFTs face many challenges when undertaking their training/dissemination activities. The most frequently mentioned challenge was transport (Table 27). This was followed by lack of relevant training materials (reference materials, manila paper, sample seeds, pens, note books, etc.) mentioned by 93% of VFTs. Other challenges included limited knowledge and resistance to change by farmers. Challenges mentioned by less than 10% of VFTs were local politics, adverse weather and lack of trust within the cooperatives.

Table 27: Percentage of VFTs facing various challenges

Challenges	All (n=86)	Male (n=66)	Female (n=20)
Fare/transport	95.3	93.9	100.0
Lack of training materials	93.0	98.9	90.0
Limited knowledge	75.5	78.8	65.0
Resistance to change by farmers	73.2	71.2	80.0
Lack of incentives	20.9	16.6	35.5
High expectations from farmers	13.9	12.1	20.0
Local politics	8.1	6	15.0
Adverse weather	7.0	7.5	5.0
Lack of trust within the cooperative	4.7	3	10.0

Ranking of challenges affecting VFTs

In order to show the magnitude of relative importance of the challenges VFTs face, they were asked to rank them. The highly-ranked challenge that affected their training/dissemination activities was fare/transport followed by lack of training materials and limited technical knowledge (Table 28).

Table 28: Overall ranking of challenges facing VFTs

	Frequency									
Challenge	1	2	3	4	5	6	7	TF	Total scores	Overall Rank
Fare /transport	32	28	13	8	1	0	0	82	738	1
Lack of training materials	23	30	17	7	3	0	0	80	703	2
Limited technical knowledge	11	11	22	16	5	0	0	65	527	3
Resistance to change by farmers	13	12	15	16	6	1	0	63	511	4
Lack of incentives	1	2	11	3	1	0	0	18	143	5
High expectation from farmers	2	3	3	4	0	0	0	12	99	6
Local politics	1	1	0	2	2	0	1	7	49	7
Adverse weather	0	2	1	2	0	1	0	6	45	8
Lack of trust within DFBA	0	1	1	1	1	0	0	4	30	9

NB. In order to compute scores for each rank, the ranks were given scores as follows; 1=10, 2=9, 3=8, 4=7, 5=6, 6=5, 7=4, and multiplied by the frequencies. Computation of overall rank was based on total sum scores

Opportunities for improving the performance of VFTs

In order to improve the performance of the VFTs, various challenges faced need to be addressed. Suggested opportunities include provision of training materials such as reference materials mentioned by about 95.3% of VFTs (Table 29). Reference materials include reference books, brochures and magazines which VFTs indicated should be translated to Kinyarwanda. Other opportunities are: provision of transport/fare, more sensitization, provision of incentives and branding which involves having a certification system where VFTs are given recognition based on their experience and performance, for example giving them certificates, bags, T-shirts and caps with the project logo. This was said to highly motivate VFTs.

Table 29: Existing opportunities to improve performance of VFTs

Challenges	All VFTs (n=86)	Male VFTs (n=66)	Female VFTs (n=20)
Provision of training materials	95.3	95.5	95.0
Provision of transport/fare	93.0	92.4	95.0
More sensitization	25.6	27.3	20.0
Provision of incentives and branding	22.1	19.7	30.0
Capacity building	75.6	77.3	70.0
Transparency	12.8	15.2	5.0
More exposure	55.8	53.0	65.0
Being non-partisan	3.5	3.0	5.0
Proper planning	4.6	4.5	5.0

In order to show the magnitude of relative importance of the opportunities mentioned, VFTs were asked to rank the opportunities that could be explored in order to improve their performance. Further analysis used scores to compute overall ranking. Provision of transport/fare had an overall ranking of number one followed by provision of training materials such as reference books/brochures and third was capacity building (more training workshops conducted on various feed technologies (Table 30). Exposure which involves exchange visits/tours and field days came fourth.

Table 30: Overall ranking of opportunities to improve the farmer trainers' approach

Opportunity	Frequency					Total Frequency	Score	Overall rank
	1	2	3	4	5			
Provision of transport/fare	34	26	17	3	0	80	334	1
Provision of training materials	23	44	13	1	1	82	333	2
Capacity building (training workshops)	18	7	25	12	3	65	220	3
Exposure (exchange visits/tours/ field days)	8	3	5	22	10	48	121	4
Increased sensitization	5	3	10	4	0	22	76	5
Provision of incentives and branding	0	5	8	4	2	19	54	6
Transparency	0	1	2	7	1	11	25	7
Proper planning	0	1	2	0	1	4	11	8
Being non-partisan	0	0	1	2	0	3	7	9

NB. In order to compute scores for each rank, the ranks were given scores as follows; 1=5, 2=4, 3=3, 4=2, 5=1, and multiplied by the frequencies. Computation of overall rank was based on total sum scores

3.7 Competence of volunteer farmer trainers

VFTs' assessment of their own competence levels on various topics

Different VFTs had disseminated various livestock feed technologies. They were asked to assess their own competence (knowledge) level of various technologies/practices they had disseminated. Rating was on a 5-point Likert scale where 5 was for very high, 4 = high, 3 = intermediate, 2 = low and 1 = very low. VFTs' competence levels were above average.

Actually, none of the technologies were rated below 3.0 (Table 31). Napier grass was rated very highly (4.9). Other technologies that had a rating of 4.1 and above were natural pasture improvement (4.6), mucuna (4.4), feed formulation and rationing (4.3), conservation of crop residues (4.3), silage making, fodder shrubs and lablab (4.1).

Table 31: VFTs' competence level scores

Topic	All VFTs	N	Male	N	Female	N
Napier grass	4.9 (0.04)	85	4.9 (0.04)	65	4.9 (0.08)	20
Natural pasture improvement	4.6 (0.07)	70	4.7 (0.08)	57	4.3 (0.20)	13
Mucuna	4.4 (0.08)	84	4.4 (0.09)	64	4.4 (0.18)	84
Feed formulation and rationing	4.3 (0.13)	41	4.3 (0.16)	29	4.5 (0.20)	12
Conservation of crop residues	4.3 (0.12)	55	4.3 (0.15)	38	4.2 (0.18)	17
Silage making	4.1 (0.17)	34	4.2 (0.17)	27	3.6 (0.43)	7
Fodder shrubs	4.1 (0.10)	84	4.1 (0.13)		4.1 (0.18)	
Lablab	4.1 (0.09)	81	4.1 (0.10)	62	4.1 (0.24)	19
Nandi setaria	3.8 (0.75)	4	4.3 (0.66)	3	2	1
Giant setaria	3.7 (0.88)	3	4.5 (0.5)	2	2	1
Hay making	3.7 (0.17)	24	3.7 (0.18)	21	3.3 (0.33)	3
Sweet potato vines	3.7 (0.13)	72	3.6 (0.16)	54	3.9 (0.24)	18
Desmodium	3.7 (0.12)	79	3.7 (0.15)	59	3.7 (0.15)	20
Rhodes grass	3.7 (0.09)	83	3.9 (0.11)	64	3.7 (0.20)	19
Brachiaria spp.	3.5 (0.19)	25	3.4 (0.25)	18	3.6 (0.29)	7
Tripsacum spp.	3.4 (0.29)	9	3.5 (0.32)	8	4	1
Lucerne	3.0 (0.54)	7	3.2 (0.58)	5	2.5 (1.5)	2

Figures in parentheses are standard error of mean

Testing VFTs' knowledge on various livestock feed practices

Testing knowledge (competence) of VFTs on livestock feed technologies is an important aspect in determining whether they are competent enough to train other farmers. Each VFT was asked 10 questions which were based on the feed technologies that they had been trained on and had already disseminated. A farmer trainer who got an incorrect answer was given a score of 0, half correct, a score of 1 and a correct answer, a score of 2. The maximum is 20 with the minimum being 0. The maximum mean score per question is 2.0 while the minimum is 0.

Analysis of results showed that VFTs had generally a high understanding of the practices they disseminate with an overall average score of 1.63 per question. The two test questions that had the highest mean score were about the best stage to cut Rhodes grass for hay and how natural pastures can be improved which had a score of 2.0 (Table 32). All VFTs who were asked these questions answered correctly (Table 34). The question that was answered correctly by a high proportion of VFTs was on the types of fodder conservation methods (79.1%) followed by suitable niches for growing fodder shrubs (73.3%). The lowest mean score (1.24) was for the question on the recommended number of calliandra shrubs needed to feed one cow per year. This question was asked to over 90% of VFTs and 44.2% answered correctly, 25.6% half correct and 22.1% answered incorrectly (Table 34). This was the question that was answered incorrectly by high percentage of VFTs. Other questions that had low ratings are: the recommended number of fodder trees to be left on farm for seed production, average bags of fresh cut Rhodes grass needed by a cow per day and the best time to harvest mucuna for silage. When data were segregated by gender, male VFTs had a higher mean score of 1.63 while female VFTs had 1.61. There was however no statistical difference between the competence level of male and female VFTs (Table 32). There was also no difference in the knowledge index of male and female VFTs (Table 33).

Table 32: Mean score of various test questions by gender

Test question	Gender	Mean score	N	Std. Error of Mean
Suitable places for growing fodder shrubs	Male	1.77	61	.054
	Female	1.89	18	.076
	Overall	1.80	79	.046
Number of calliandra shrubs needed to feed one cow per year	Male	1.24	62	.107
	Female	1.24	17	.182
	Overall	1.24	79	.092
Recommended fodder trees for seed production	Male	1.31	49	.110
	Female	1.27	15	.206
	Overall	1.30	64	.096
Recommended spacing for planting calliandra for hedges	Male	1.58	57	.075
	Female	1.69	16	.120
	Overall	1.60	73	.064
Type of fodder conservation method	Male	1.90	58	.047
	Female	1.83	18	.090
	Overall	1.88	76	.042
Best time to harvest maize fodder for silage	Male	1.62	34	.112
	Female	1.91	11	.091
	Overall	1.69	45	.089
Kg of dry tree equivalent to 1 kg of dairy meal for same milk yield	Male	1.51	47	.105
	Female	1.20	15	.223
	Overall	1.44	62	.097
Materials needed for silage making	Male	1.91	46	.042
	Female	1.94	16	.063
	Overall	1.92	62	.035
Best time to harvest mucuna for silage	Male	1.31	39	.117
	Female	1.75	12	.179
	Overall	1.41	51	.102
How Napier splits are planted	Male	1.90	20	.100
	Female	1.80	5	.200
	Overall	1.88	25	.088
How Napier canes with three nodes are planted	Male	1.73	40	.080
	Female	1.50	14	.203
	Overall	1.67	54	.079
How are calliandra seeds pre-treated	Male	1.56	34	.113
	Female	1.44	9	.242
	Overall	1.53	43	.102
Best time to cut Napier grass for silage	Male	1.85	34	.062
	Female	1.50	16	.183
	Overall	1.74	50	.075
Type of cereal crops that can be used as crop residues	Male	1.72	18	.109
	Female	1.80	5	.200
	Overall	1.74	23	.094
Best time to sow Rhodes grass	Male	1.89	9	.111
	Female	1.67	3	.333
	Overall	1.83	12	.112
How Napier grass is established	Male	1.86	7	.143

Test question	Gender	Mean score	N	Std. Error of Mean
	Overall	1.86	7	.143
Average bags of fresh cut Rhodes grass needed by a cow per day	Male	1.43	7	.202
	Female	1.00	2	0.000
	Overall	1.33	9	.167
Best stage to cut Rhodes grass for hay	Male	2.00	6	0.000
	Female	2.00	1	
	Overall	2.00	7	0.000
Best season for establishing Rhodes grass in areas with two rainy seasons	Male	2.00	5	0.000
	Female	1.67	3	.333
	Overall	1.88	8	.125
Any type of shrub used for fodder	Male	1.69	16	.151
	Female	1.50	2	.500
	Overall	1.67	18	.140
How can natural pastures be improved?	Male	2.00	9	0.000
	Female	2.00	2	0.000
	Overall	2.00	11	0.000
Overall	Male	1.63	658	.024
	Female	1.61	200	.045
	Overall	1.63	858	.021

Table 33: Total mean score and knowledge index by gender

Gender	Overall	Male	Female
Total score	16.22 (0.18)	16.26 (0.22)	16.10 (0.33)
Knowledge index	0.81 (0.01)	0.81 (0.01)	0.81 (0.02)

Figure in parentheses are SE

Table 34: Percentage of VFTs and how they scored

Test score	Incorrect	Half correct	Correct	Total
	% of VFTs (n=86)			
Any type of shrub used for fodder	1.2	4.7	15.1	20.9
Suitable places for growing fodder shrubs	0.0	18.6	73.3	91.9
Number of calliandra shrubs needed to feed one cow per year	22.1	25.6	44.2	91.9
Recommended fodder trees for seed production	14.0	24.4	36.0	74.4
Recommended spacing for planting calliandra for hedging	2.3	29.1	53.5	84.9
Kg of dry calliandra fodder equivalent to 1 kg of dairy meal for same milk yield	11.6	17.4	43.0	72.1
How calliandra seeds pre-treated	4.7	14.0	31.4	50.0
Types of fodder conservation methods	1.2	8.1	79.1	88.4
Best time to harvest maize fodder for silage	3.5	9.3	39.5	52.3
Materials needed for silage making	0.0	5.8	66.3	72.1
Best time to harvest mucuna for silage	8.1	18.6	32.6	59.3
How Napier splits are planted	1.2	1.2	26.7	29.1
How Napier canes with three nodes are planted	3.5	14.0	45.3	62.8
Best time to cut Napier grass for silage	2.3	10.5	45.3	58.1
How Napier grass is established	0.0	1.2	7.0	8.1
Type of cereal crops that can be used as crop residues	0.0	7.0	19.8	26.7
Best time to sow Rhodes	0.0	2.3	11.6	14.0
Average bags of fresh cut Rhodes grass needed by a cow per day	0.0	7.0	3.5	10.5
Best stage to cut Rhodes for hay	0.0	0.0	8.1	8.1
Best season for establishing Rhodes grass in areas with two rainy seasons	0.0	1.2	8.1	9.3
How can natural pastures be improved	0.0	0.0	12.8	12.8

3.8 The spread of the VFT approach

As discussed in the methods section, nine organizations (four dairy cooperatives, two food crop cooperatives, two government organizations, and an NGO) were identified that had adopted the VFT approach as a result of their exposure to it in EADD or to results of research on the approach.

Rwanda Agriculture Board (RAB)

The RAB's mission is to develop Rwanda's agricultural sector using research, extension, education and training in modern methods of crop and animal production. RAB worked closely with the EADD project in providing training to VFTs and testing fodder species with them on their farms. When the EADD project ended in 2012, RAB took over the training and backstopping of 64 of EADD's 86 VFTs, including 13 women. They continued training in the subjects that the EADD project had provided training in, that is, feeds, nutrition, extension, communication and gender. RAB also decided to broaden the VFT's scope of work to include breeding, animal health, milk quality and hygiene. RAB also changed the name of the VFTs to Community Animal Health Workers (CAHWs).

The CAHWs are supervised and facilitated by the RAB district officer through the administrative sector veterinary officer. CAHWs are given cash for transportation and communication. They are sometimes given caps, T-shirts, overalls, gumboots, training, certificates, and planting materials for demonstrations. They report twice a week to the veterinary officer and sometimes accompany him on field visits.

In March 2015, RAB recruited 64 additional CAHWs, including 12 women, bringing the total number of CAHWs to 130, including 25 women.

Dairy cooperatives

Four dairy cooperatives co-supervise VFTs with RAB: Dukundamatungo and Rubona in Rwamagana District, and Isangano and Matimba in Nyagatare District. All four were involved in the EADD project and had VFTs during the project. After the project ended operations in Rwanda in 2012, the Cooperatives co-supervise the VFTs along with RAB. Cooperative managers said that the VFTs serve an important link between the cooperatives and farmers, representing the interests of members to cooperative management and passing messages and other materials (brochures, seed and inputs) from management to members.

The cooperative managers assist VFTs to get training and training materials from other organizations such as NGOs, and projects such as Livestock Support Infrastructure Programme (LISP) and Rwanda Dairy Competitiveness Program (RDCP). Mr. Mugabe Tharcisse, chairperson of the Isangano Cooperative claims that the arrangement under which the cooperative and RAB co-supervise VFTs is practical, cost-effective and sustainable.

Cooperative representatives believe that the most important reasons why VFTs continue working without being paid are altruism, and access to knowledge and technology. Income-generating activities, social status, networking and project material benefits are also important. Some VFTs reported that they give away seed from their demonstration plots while others reported selling it.

Food crop cooperatives

RAB's Crop Production and Protection Department has also helped an Irish potato cooperative in Musanze District and a maize cooperative in Rulindo District to implement the VFT approach. The potato cooperative has 10 VFTs (four women) and the maize cooperative has 11 VFTs (three women). RAB plans to help scale up the approach to other food crop cooperatives.

Livestock Infrastructure Support Programme (LISP)

LISP is a government (MINAGRI) programme whose mission is to enhance the effectiveness of the livestock sub-sector and develop both milk and beef value chains. LISP assists dairy cooperatives and farmers in general in animal feeding, breeding, animal health and milk quality. Because it is a programme that has to reach many farmers, LISP used to rely solely on permanent staff to do extension work. However, the cost was high so project managers decided to opt for the VFT approach so as to reach greater numbers of farmers.

Umutoni Harriet, the LISP post-harvest storage and marketing specialist said *"We knew ICRAF was also working with farmers in the EADD project but with a different approach. We then went to learn how they were doing it and especially how they were working with and reaching the communities."* ICRAF through the EADD project trained LISP staff on how the VFT approach works.

LISP selects expert farmers from all over the country and facilitates them to train other farmers in their own and other cooperatives on a volunteer basis. These farmers, called farmer trainers, are jointly supervised by LISP and the respective cooperatives. Both LISP and the cooperatives approve the farmer trainers' work plan. Among the 42 LISP farmer trainers, seven of them are former EADD VFTs.

All of the costs that farmer trainers incur (accommodation, meals, communication and transport) are reimbursed by LISP. The farmer trainer prepares an activity report (with a timesheet attached to it) that is approved by both the cooperative and LISP and the cooperative assesses the work done. LISP transfers the funds to the cooperative's accounts and the cooperatives then pay the farmer trainers according to the work they have performed.

LISP staff believe that farmer trainers' main motivating factor to become farmer trainers is altruism because many trainers happen to have other income-generating activities that they should be doing but prefer to sacrifice some of their times to help their neighbours, relatives and the community in general. The second motivating factor is the social networking; farmer trainers are eager to be exposed to other development actors and community leaders in order to get assistance to help them develop their farms and those of their respective communities.

Heifer Project International

Heifer Project International (HPI) is an international not-for-profit development organization working with communities to end hunger and poverty while caring for the environment. Livestock is the backbone of their work. HPI has several projects in Rwanda and has been the lead partner in the EADD project, where they were leading a consortium of four other partners: Technoserve, International Livestock Research Institute (ILRI), ICRAF, and African Breeding Services Total Cattle Management (ABS TCM). In projects outside EADD, HPI established a network of community animal health providers (CAHPs) who offer fee-based services such as routine animal health care, including vaccinations, artificial insemination and simple emergency procedures. In addition, the CAHPs serve as disease monitors, helping contain outbreaks, and link government agents and private veterinarians to rural farm families. On a daily basis, CAHPs are available to farmers directly or through dairy cooperatives where they may be registered as Business Development Service Providers.

This approach has been effective because CAHPs have a financial interest in promoting such practices as animal health and artificial insemination. It is less effective in areas such as feeds because the CAHPs do not benefit directly from promoting feed practices. The HPI extension system seems to be the same as the VFT approach and differs only from the fact that there are some fee-based services such as artificial insemination that motivate the CAHPs to do the free extension work. Embedding some income generating services in the VFT approach has made VFTs more active than usual as they are now earning financial benefits. When they conduct free training sessions for farmer groups, they use these to explore opportunities for offering group members fee-based services.

4.0 Discussion

This study has clearly demonstrated that the use of volunteer farmers in extension is an approach that should be highly promoted as it has the potential to spread technologies to many farmers within a short period of time. In this study VFTs were able to reach an average of 24 farmers per month and an average of 217 farmers per trainer within a period of 3.5 years. This is indeed remarkable considering that they face many challenges when undertaking their dissemination activities. Despite the challenges, they are also motivated by several factors. This section will discuss the motivations, challenges and opportunities that exist for improving farmer-to-farmer extension in Rwanda.

4.1 Motivation

Before becoming farmer trainers, farmers were motivated by various reasons which included in order of importance: gaining knowledge and skills, altruism, project benefits, social benefits and income came last. It was mentioned by a paltry 6% of VFTs. After about three and a half years disseminating/training without pay, increased demand for training was the most important motivation. This was followed by gaining knowledge and skills, project benefits and altruism. Income was mentioned by only 15% of VFTs, an increase of 9%. Gaining knowledge and skills was an important motivation which they said would result in increased productivity on their farms, hence the high importance attached to it. Altruism is rooted in the African culture and more so embedded in Rwanda's national programmes. It is rooted in the Ubudehe programme which is a Rwandan system of intra-community co-operation based on collective and individual actions. It is initiated and implemented by the community itself at the level of the decentralized administrative entity nearest to the recipients, i.e. the cell/villages. The exact name of the programme ("Ubudehe mu kurwanya ubukene") means 'intra-community cooperation to fight poverty'. So altruism is an extension of the cultural system of improving the welfare of community members.

Demand for training is a new motivation that surfaced after VFTs started training. The reason why they rated it as the most important factor that continues to motivate them is due to the fact that as more and more farmers hear about their good work, the number of requests increase. This gives them confidence and the assurance that their efforts to help the community are appreciated.

The increased demand for training in Rwanda may be linked to the Girinka Programme (one cow per poor family). This programme aims at enabling every poor household to own and manage an improved dairy cow which would help the family to better their livelihood through increased milk and meat production and to improve soil fertility of their land for their crops using the available manure. This will not only improve nutrition, but also increase the earnings of beneficiaries from milk products, meat and the sale of manure (MINAGRI 2009).

The programme also aims at promoting social cohesion through a system where the first born calf is passed on to other farmers in the community. Rearing of livestock requires knowledge and skills which not many farmers in Rwanda have. Considering that the government extension system cannot provide the much needed extension advice to farmers due to budgetary constraints, the VFTs are therefore much sought after by farmers wanting to acquire knowledge of and skills on improved feed innovation technologies.

Other motivating factors include project benefits which include going for tours and exchange visits. Social benefits in order of importance include gaining confidence, increased social networks, enhanced social status and exposure. VFTs attach a lot of importance to these benefits which they said enabled them to meet different people, learn about new places and be known by the community. As a result of conducting several training sessions, VFTs indicated that they had gained a lot of confidence. Income was not given much importance because most VFTs had not received any financial benefits from services associated with training. As the demand for training and inputs increases, more and more VFTs may soon realise a financial benefit.

4.2 Challenges and opportunities

Transport

This study has shown that VFTs undertake dissemination activities in the midst of many challenges. The most important challenge was transport/fare. VFTs travel an average of 7.6 km a day and mostly on foot. A few use their own bicycles and motorcycles. The fact that they cover long distances limits their work and therefore they cannot train as frequently as they wish nor can they cover more villages farther from their own. Possible suggestions to address this challenge would be for their dairy cooperative societies to provide bicycles to them through a check off system. Another option is for projects that have adopted farmer-to-farmer extension to increase the number of farmer trainers so as to reduce the distance they cover.

Technical backstopping

Another challenge faced is the lack of training materials. This was mentioned by over 90% of VFTs. For VFTs to be effective and up-to-date with the current knowledge they need training materials which they can use for reference. A possible solution to this may be for cooperative societies to set up small libraries where farmers can access training materials. The VFTs indicated they preferred training materials that are written in Kinyarwanda. It is therefore important that all training materials available be translated into Kinyarwanda. Only then can they be useful to VFTs. Another challenge is limited technical knowledge on some topics. The knowledge test given to VFTs showed they generally are knowledgeable about most technologies they disseminate; however, there are a few topics where VFTs require more training. Refresher courses need to be carried out from time to time to improve their knowledge and skills. This should be undertaken after a capacity-needs assessment has identified areas where VFTs need more training. By so doing, VFTs will be kept up to date with the current knowledge and skills. The VFTs need to be linked to mainstream government extension service for technical support.

The use of mobile phones

Mobile phone technology is presenting VFTs with an unprecedented opportunity to mobilize many farmers for training within the shortest time possible. Use of mobile phones and publicizing through DFG leaders were the two most popular methods used for mobilizing farmers. This clearly shows that VFTs have also embraced the use of information communication technology in their work and they should be highly encouraged in order to

save on costs and time. They do this by sending text messages to farmers informing them about the date, time and venue of the training. They however complained about the costs of airtime which still costs much less compared to the time they would spend travelling to mobilize farmers. It is important to note that over 90% of VFTs used mobile phones to mobilize farmers. There is therefore a huge potential for extension programmes to use the innovations in mobile technology and their application to enable smallholder farmers to access relevant and timely agricultural information at minimal cost. This not only provides new opportunities for rural farmers to access information on agricultural technologies, but also to use of ICTs in receiving advice and providing feedback, creating a learning culture.

Incentives

It is a central theme of economics that incentives promote effort and enhance performance. It is argued that without incentives, there will be little action (Wellard et al. 2013). A review by Wellard et al. (2013) on community extension approaches showed that 25% of community extension trainers in the Self Help Africa project in Uganda dropped out because of small allowances paid for attending meetings. This study has shown that one of the challenges mentioned by VFT is lack of incentives. In order to enhance their performance, projects using farmer-to-farmer extension can provide non-monetary incentives that are not costly such as giving VFTs recognition through provision of certificates, badges, T-shirts and caps. They may seem small, but would greatly enhance their performance. Another way of increasing recognition is to have a contest where the best VFT is given an award in a public ceremony for outstanding performance. Competition can add motivation and hence enhance performance. Folger (1993) however cautions that this only works if the organizational reward system operates in a just, procedurally fair manner. For it to work, the criteria for the reward system has to be developed in a participatory and transparent manner involving all stakeholders. Other incentives may include exchange visits which may provide knowledge and exposure to VFTs. It is important to note here that exposure was one of the four main social benefits that VFTs attach a lot of importance to.

5.0 Conclusion

The findings of this survey of VFTs and organizations, has shown the complementary role VFTs play in meeting the demands of farmers in an environment where the state extension system has budgetary challenges that restrict extension staff from effectively providing services to farmers. The ‘one cow per family’ programme has created a huge demand for knowledge and skills on fodder that cannot be met by government extension service. VFTs have the advantage of living in the community and working with groups within and outside their villages and are therefore able to reach many farmers within a short period of time with minimum resources. However for them to work effectively, challenges that they face must be addressed. Secondly, this study has shown that motivation plays an important role in enhancing volunteer farmer trainers’ performance. Organizations implementing farmer-to-farmer extension programmes need to keep VFTs motivated. This study has argued that even low-cost motivations such as providing recognition in the form of rewards, certificates, badges and organizing exchange visits can be important incentives for farmers to continue volunteering. Kiptot and Franzel (2014) showed that such incentives greatly motivate VFTs. Third, farmer-to-farmer extension programmes need to embrace the use of mobile phone technology. This study has shown that over 90% of VFTs use mobile phones when undertaking their dissemination activities. If embraced, mobile phone technology will greatly reduce the time and costs required to undertake such activities. Finally, this study has shown that the approach has spread to other organizations in Rwanda keen on increasing the numbers of farmers they reach in a cost-efficient manner. The increased sharing of experiences on using the approach, through such mechanisms as workshops, policy briefs and videos, can further enhance its spread.

6.0 References

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